

Nuclear Safety Case Summaries

Objective: Determine the NTS reportability for each case.

Instructions: Read each case and determine:

1. Is there a nuclear nexus?
2. Are there any noncompliances?
3. Does the case meet any of the nuclear safety noncompliance reporting criteria?
4. If not, does the case meet any of the other nuclear safety reportable conditions?
 - a. Repetitive Noncompliances
 - b. Programmatic Issue
 - c. Intentional Violation or Misrepresentation
 - d. Substantiated worker retaliation with a nuclear safety nexus
5. Are there any other reasons to file an NTS report?

Case 1: Cheating on Radworker Examinations

A contractor employee taking his 2 year re-qualification Radiation Worker 1 examination was observed by the instructor attempting to cheat on the written examination. At the start of the test the instructor informed the class that this was a closed book test and to put away any notes or papers. During the course of the test the instructor noticed an individual looking at something on his lap. The instructor approached the individual and found a small sheet of paper that contained the question numbers and the corresponding correct answers for all 50 questions on the exam. The individual was expelled from the class and his supervisor was notified. The individual's Radworker 1 qualification had already expired prior to the exam and it has not been renewed. In addition the written examination for the Radworker 1 Classroom Training was immediately revised. A formal disciplinary investigation ensued and on August 12, 2011 the individual was suspended pending completion of the investigation. The employee has since been terminated.

About one month later, a second occurrence of attempted cheating was identified. A subcontractor employee was caught with a "cheat sheet" while taking his Radiological Worker 1 classroom examination. The cheat sheet used by the contractor appeared to be different than the one previously used by the employee. It was written on the back of a store register receipt and is believed to have been prepared during a break between the class and the exam. The subcontractor management was immediately notified. The individual's Radworker 1 qualification had already expired prior to taking the class and was not renewed. In addition, the individual was banned from any future work at the site.

Based upon the similarities between the two attempted cheating incidents, the contractor is conducting an investigation to determine if an institutional issue concerning cheating on examinations exists at the site. Preliminary indications are that these two instances were not connected, but the investigation is still ongoing. In addition, an independent assessment team has been charged with conducting an evaluation of site testing protocols; culture and attitude toward testing; testing effectiveness and compliance with requirements. When complete, the results of our continuing investigation and the independent assessment will be included in an update to this report.

Case 2: CAM alarm in Building 221

Building 221 personnel received a room continuous air monitor (CAM) alarm while performing a planned bag-out activity, involving Pu-238 in a sealed container. Personnel were wearing the appropriate personnel protective equipment which included respiratory protection. Upon receipt of the alarm, the Fissile Material Handlers (FMHs) immediately exited the room and notifications were made to the Health & Safety (H&S) Technicians, Facility Safety Office, and Facility Health Physicist.

Two H&S Technicians, in appropriate PPE, were directed by the Health Physicist to reenter the room and collect the CAM filter paper for analysis. It was noted at this time that a second CAM in the room had alarmed. The filters were collected and swipes of the work area were taken, and no contamination was detected.

Initial surveys of the individuals detected no contamination. Swipes of one individual's respirator indicated 90 disintegrations per minute (dpm) on the outside of the respirator and 31 dpm on the inside. Contamination levels up to 400 dpm/100 cm² were found on the individual's personal clothing, prior to exiting the RMA; however, their skin was surveyed, and no contamination was detected.

Results of the CAM filters were 4285 dpm alpha/198 dpm beta for the CAM closest to the workstation and 518 dpm alpha/31 beta for the CAM further from the workstation.

Nasal swabs were collected for the individuals in the room at the time of the initial alarm. Results of the nasal swabs indicate one worker slightly elevated above detection limits. Precautionary bioassay kits were provided to two workers.

ORPS Reporting Criteria:

4B(3) - Actuation of a Safety Significant Structure, System, or Component (SSC), or its alarms as a result of an actual unsafe condition. Spurious alarms (e.g., due to electronic noise, radon/thoron decay) should not be reported.

Significance Category: 3

Case 3: Radioactive Contamination in Sink

A Radiological Control Technician (RCT) detected contamination in a non-radiological sink during a routine monthly survey. Research was being performed in the laboratory over the past two weeks using Tc-99m, TI-201 and I-123. The contractor determined that a radiation worker disposed of approximately 1 cc of contaminated saline solution in the sink. The saline solution was put in the sink two days before it was detected by the RCT.

The sink strainer was surveyed and found to have 0.56 microcuries of I-123, 0.36 microcuries of TI-201, and 0.31 microcuries of TI-202 (a contaminant in TI-201). The total activity was 1.23 microcuries, or 2,730,600 disintegrations per minute per 100 cm².

The 10 CFR 835 Appendix D, Total Surface Contamination Levels for I-123, TI-201, and TI-202 is 5,000 dpm per 100 cm².

ORPS Reporting Criteria:

6B(2) - Identification of onsite radioactive contamination greater than 100 times the total contamination values in 10 CFR Part 835 Appendix D, exclusive of footnote 3 to Appendix D, and that is found outside of the following locations: areas routinely posted, controlled and monitored for contamination, areas controlled in accordance with 10 CFR Section 835.1102(c), and, per Section 835.604(a), any non-posted area that is under the continual observation and control of an individual knowledgeable of and empowered to implement required access and exposure control measures.

Significance Category: 2

Case 4: Worker Retaliation

Big Corporation, Inc. (BCI) received a “Decision and Order of the Department of Energy” dated February 13, 2011, which found BCI liable under 10 CFR 708, *DOE Contractor Employee Protection Program*, and ordered reinstatement of the plaintiffs.

BCI hired the plaintiffs in January 2010 as engineers for the Waste Recycle Plant (WRP) located in Washington DC. In March 2010, waste shortages and revised recycling requirements forced BCI into a significant reduction in force (RIF).

On April 1 and 15, 2010, plaintiffs raised concerns to management about the safety of a recycle system. Plaintiffs were among the employees released in the RIF in July 2010. Plaintiffs alleged that they were included in the RIF in retaliation for having raised safety concerns.

A DOE-OHA assessment identified that several employees associated with the BCI recycle project expressed concern that they feared being subjected to retaliation if they identified safety concerns associated with the project. A separate DOE-OHA investigation led DOE to conclude that some BCI employees were subjected to an environment and culture that does not fully embrace full and open reporting of injuries and concerns.

An independent assessment of BCI’s safety culture identified areas within the company having hostile work environments resulting in a chilling effect on raising issues. The apparent causes fell into the areas of leadership practices, standards, and interpersonal skills. Assessment findings included:

- BCI site management had been at times not sensitive to employees needs, and did not employ supportive management styles and effective interpersonal skills.
- BCI had not established a sufficiently effective employee concerns program.
- Some BCI managers communicated in a disrespectful and unprofessional manner.

Since 2010, BCI has taken steps to strengthen its processes for identification and resolution of safety concerns, for documentation of employee performance, and for reviewing any potential employment actions.

Case 5: Penetration Fire Seals

The Department of Energy evaluated the Armature, Inc. (ARM) penetration fire seal program at a test reactor in El Paso, TX. Several quality deficiencies were observed with the installation of fire-stopping material, as well as failure to follow required procedures. Of the 26 penetration seals randomly selected for evaluation, 18 were found to be deficient. There are approximately 1,100 penetrations within the reactor building.

The DOE prime contractor, Advanced Technologies, Inc. (ATI) and the installation subcontractor ARM prepared documentation to govern the installation and quality assurance of penetration fire seals at the test reactor. These seals are designed to provide the same fire rating as the structure being penetrated and are also credited in the DSA for controlling the spread of radiological contamination.

ATI required ARM to submit documentation for ATI "approval showing standard (applicable) penetration fire seal assemblies, and where a non-standard condition exists, obtain a design recommendation /engineering judgment from the seal manufacturer." In addition, ARM was required to submit for ATI's review a QA/QC plan for performance of the work. ARM prepared Work Process Procedure ARM-WPP-FSP-001, "Fire Seal Procedure." This procedure established requirements to identify and install fire seals, and to verify that installation complied with all technical requirements.

A Fire Seal Traveler form was developed to document the technical verification, installation, and inspection of each seal. The traveler form was initialed by the installer, ARM QC and ATI QC personnel to verify acceptance of the installed fire seals. Each penetration seal was identified by a tag affixed to the structure near the penetration.

Utilizing the ATI approved code compliant assemblies as the basis for evaluating the installation of penetration seals, the DOE Team walked through the facility and destructively evaluated several penetrations.

Of the 26 penetration seals randomly selected by the evaluation team, 18 were found to be deficient. Of the 18 deficient seals, 11 were never installed, although the corresponding travelers documented installation and approval of the seals by ARM personnel and QC verification by ATI.

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Nuclear Safety Noncompliance Reporting Criteria (as of January 1, 2012)

Nuclear Safety Noncompliances Associated With Occurrences (DOE Order 232.2)

Consult the DOE Order for the full text of each occurrence criterion¹

Reporting Criteria Group	Subgroup	Occurrence Category and Summary Description ²
1. Operational Emergencies ³	N/A	(1) Operational Emergency (2) Alert (3) Site Area Emergency (4) General Emergency
2. Personnel Safety and Health	C. Fires	(1) Fire within primary confinement/containment (2d) Self-extinguishing fires
	D. Explosions	(1) Unplanned explosion within primary confinement/containment
3. Nuclear Safety Basis	A. Technical Safety Requirement (TSR) Violations	(1) Violation of TSR/Operational Safety Requirement (OSR) Safety Limit (2) Violation of other TSR/OSR requirement (3) Violation of DSA hazard control
	B. Documented Safety Analysis (DSA) Inadequacies	(1) Positive unreviewed safety question
	C. Nuclear Criticality Safety	(1) Criticality accident (2) Loss of all valid criticality controls
4. Facility Status	A. Safety Structure / System / Component (SSC) Degradation	(1) SSC performance degradation ⁴
	B. Operations	(1) Stop Work Order from DOE (2) Actuation of Safety Class SSC (4) Facility Evacuation
5. Environmental	A. Releases	(1) Radionuclide release
6. Contamination/ Radiation Control	A. Loss of Control of Radioactive Material (RAM)	(1) Offsite RAM exceeding DOE limits (2) Loss of RAM (>100X 835 App. E)
	B. Spread of Radioactive Contamination	(1) Offsite radioactive contamination ⁵
	C. Radiation Exposure	(1) Exceedance of DOE dose limits (2) Unmonitored exposure (3) Single exposure > thresholds
	D. Personnel Contamination	(1) Offsite medical assistance (2) Offsite personnel/clothing contamination (3) Onsite personnel/clothing contamination ⁶

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7. Nuclear Explosive Safety	N/A	(1) Damaged nuclear explosive (2a) Introduction of electrical energy (2b) Safety feature compromise (2c) Inadvertent substitution (2d) Violation of a safety rule
10. Management Concerns/Issues	N/A	(1) Initiation of a Federal Accident Investigation (3) Near miss

Other NTS Nuclear Safety Reportable Conditions

Reporting Threshold	Notes ⁷
Programmatic deficiencies involving noncompliances	A programmatic problem generally involves some weakness in administrative or management controls, or their implementation, to such a degree that a broader management or process control problem exists and requires broad corrective actions.
Repetitive noncompliances	Two or more different events/conditions that involve substantially similar work activities, locations, equipment, or individuals.
Intentional violation or misrepresentation	Also known as willful noncompliance; may involve record falsification.
Substantiated management reprisal(s) against worker(s) for raising safety issues involving 830/835 noncompliances	Customarily referred to as worker retaliation ⁸ .

Notes to Tables

1. The simple occurrence of an event or discovery of a condition in any of the listed categories is not by itself sufficient to warrant NTS reporting. NTS reporting requires the identification of a 10 C.F.R. Part 830 or 835 (or any other nuclear safety rule) noncompliance in conjunction with the event or discovery. Contractors identifying a significant nuclear safety noncompliance (i.e., one with the potential to cause radiological harm) in association with an event/discovery type or category not listed on the table should evaluate the event for NTS reportability.
2. These summary descriptions are a brief characterization of the related criteria. Use the full statement of the criteria contained in DOE Order 232.2 to determine NTS reportability of event-related nuclear safety noncompliances.
3. Report nuclear safety noncompliances associated with any of the DOE Order 232.2 Operational Emergency categories (Operational Emergency, Alert, Site Area Emergency, General Emergency).
4. Report noncompliances associated with a degradation of Safety Class Structure, System, or Component preventing satisfactory performance of its design function when required to be operable or in operation.

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5. Report noncompliances associated with an offsite spread of contamination event where a contamination level exceeds 100 times the applicable value identified in 10 C.F.R. Part 835, Appendix D.
6. Report noncompliances associated with a personnel/personal clothing contamination where a contamination level exceeds 100 times the applicable total contamination value identified in 10 C.F.R. Part 835, Appendix D.
7. Refer to the Enforcement Process Overview for more information about these types of noncompliances.
8. Worker retaliation as defined in 10 C.F.R. Part 708.